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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,042	02/18/2004	Jamie Knapp	60158 (70919)	5602

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Peter F. Corless, Esq.
EDWARDS & ANGELL, LLP
P. O. Box 55874
Boston, MA 02205

EXAMINER	
PADGETT, MARIANNE L	

ART UNIT	PAPER NUMBER
1762	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/782,042	KNAPP, JAMIE	
	Examiner	Art Unit	
	Marianne L. Padgett	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/18/04 & telephone election of 7/18/05*.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) *14-22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☒ Claim(s) *3* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/18/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-13, drawn to a method of depositing a glass-like coating via ion plating, classified in class 427, subclass 529 or 527.

II. Claims 14-22, drawn to a substrate, classified in class 428, subclass 411.1.

2. The inventions are distinct, each from the other because of the following reasons:

Inventions Group I and Group II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the deposition can be done by sol-gel or sputtering methods.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Christine O'Day on July 18, 2005 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-13. Affirmation of this election must be made by applicant in replying to this Office action. Claims 14-22 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Claim 3 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 3 is dependent upon itself, hence is not properly dependent on a preceding claim, and as presently written has no context with respect to limitations of the independent claim 1 or claim 2, which

precede it, thus as written cannot be properly treated with respect to prior art. For purposes of examination with respect to the art, claim 3 will be treated as if it were dependent on claim 2or claim 1.

6. Claims 1-2 & 4-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A term "glass-like", as found on lines 1 & 4 of claim 1 is vague and indefinite, as it is uncertain what scope this term encompasses, such as whether it includes or excludes glasses, since "glass-like" could be considered to be that the coating is like glass, but is not glass, or it could be considered to include glass & other materials that are not actually glass, but have some characteristics, such as composition (various oxides, etc.), or microstructure (amorphous), etc., which are characteristic of glass. While the term "glass-like" was used in the specification (e.g. page 1), no definition thereof was found in the specification.

In claim 1, the relationship between the "forming..." step & the "depositing..." step is unclear, because the overall phrasing implies that the forming step is something different than the depositing step, which would mean that there are two different glass-like coating layers or sets of coating layers being created, but that use of the article "the" in line 6 of claim 1 in front of "at least one coating layer" shows antecedences from the forming step.

Also in claim 1, in the second to last line it is noted that "... layer is conformal throughout the substrate...", is possibly a misnomer or contains an ideological relationship, since the word "throughout" as applied to the substrate would mean that it is **inside** a substrate, which would be impossible for something that is a layer which is on the substrate, as well as inconsistent with the definition of conformal. Applicant may wish to more carefully consider the word choice.

In claim 2, the meaning of "the sum of the thicknesses of each of the at least one coating layer..." is ambiguous, since it literally requires a different sum for each layer, but a single layer only has one

thickness, hence has nothing to be summed. Therefore what is actually being claimed when there is more than one "coating layer" is uncertain.

With respect to claims 10-11, the examiner notes that the usual meaning of the word "reagent" implies a compound, which is used in the forming of a different resultant material, however the specific materials listed in claim 11 dependent from claim 10 list elements as reagents, thus sheds doubt on the intended meaning or scope of claim 10. The examiner notes that the term reagent is used with respect to the coating materials 22 & 22' as disclosed in the last paragraph on page 5, where elements as present in claim 11 are listed, but listed as zirconium reagent, etc., however the same paragraph also says that these coating materials which are reagents can form an oxide coating & the ref.# is therein referred to figure 1, which shows the coating material = reagent as residing in payment structures 20 & 20', which as drawn appear to be cross-sections of crucibles, thus the specification is also ambiguous as to whether elements are being employed, or reagents which may decompose to react to form an oxide coating or a glasslike coating.

The Markush group claimed 12 can be considered improper, as the species "an electronic device substrate" is not a species of the same genus as the rest of the species listed therein, of glass, metal, plastic, semiconductor substrates, which are types of materials. Also, "an electronic device substrate" is ambiguous as to whether it is claiming a substrate that is to be used for forming such device or a substrate which is such a device, further noting that an electronic device or a substrate used therefore can be made of any of the materials of the other "species" of the Markush group, such that this last species improperly overlaps with all the other species.

In claim 13, what is meant by "a coating vessel" is not apparent from the claim language, since various objects used to make coating process as described in claim 1 may be called vessels, including the reaction chamber which may be capable of being evacuated, or various types of closed crucible structures, which may be evacuated while, or reagent gas containers, which may have valves, be airtight, hence be

capable of being evacuated, etc. From review of the specification (page 5 & figure 1), the examiner suspects that "evacuatable coating vessel 12", which as illustrated is the vacuum chamber, is what was intended.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-7 & 10- 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knapp et al. (5,753,319), in view of Hahn (4,990,233).

Claims 1-3 & 5-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knapp et al. (5,753,319), in view of Zöller et al. (5,597,622), or vice versa.

Knapp et al. (319) teach multilayer ion plating coatings comprising titanium oxide, which is preferably amorphous, as well as oxides, such as SiO_2, Al_2O_3, MgO, etc., thus due to compositional and morphological characteristics, these layers are considered to encompass "glass-like" coatings, noting that the ion plated titanium oxide multilayer coatings are taught to exhibit significantly enhanced performance characteristics for lower manufacturing costs. Multilayer depositions are taught to include alternating oxide deposits. The ion plating process employs a vacuum vessel, a plasma source, one or more electron beams, which supply electrons directed towards the containment structures for the coating materials. Suitable coating materials are taught to include either the oxide or the metal thereof, which is intended to be deposited, such as titanium metal, or titanium oxide, dioxide or pentoxide, and reactive gases such as oxygen may be employed during the process of depositing thin films. Substrates that may be so coated are taught to include semiconductor substrates, including photovoltaic & photoconductive surfaces of photodetectors and LEDs, microelectronic devices, optical filters, sighting devices, glass, plastic or metal substrates, teaching of possible coatings including bandpass filter coatings, antireflection coatings,

reflector coatings, passivation layers, etc., where it is additionally taught the coating may act as a hermetic encapsulant. Particularly see the abstract, figure 5; col. 1, lines 5-22; col. 2, lines 15-35 & 53-67; col. 3, lines 35-col. 4, lines 25 & 36-45+; col. 5, lines 6-34; col. 6, line 60-col. 7, line 5 & 24-65; col. 9, lines 49-col. 10, line 13 & 46-col. 11, line 25; col. 12, lines 52-65; col. 14, lines 5-col. 15, line 67+, especially col. 15, lines 28-65; and col. 16, lines 10- 22, which mentions use in "three cavity SiO_2/TiO_x multilayer bandpass filter coatings"; plus examples.

While Knapp et al. (319) teach a fairly large variety of substrates applicable to their process, where many of the substrates might be inclusive of nonplanar substrates, none of the substrates discussed therein are necessarily nonplanar (unless the three cavity bandpass filter, means that taught multilayers are being deposited in cavities that are nonplanar, but the examiner has no idea what structure this actually represents), thus by not necessitating a nonplanar substrate differ from the present claims that require conformal deposition on a nonplanar surface. Also while Knapp et al. (319) specifically teach their coating process is applying "thin film" coating layers (col. 14, lines 9-10 & 53-55), they do not appear to recite specific layer thicknesses, although there is much discussion of alternating multilayer deposits to be employed for specific optical purposes, such as absorption or transmission, which would thus necessitate uniform deposition & thickness control in order to be effective for taught purposes.

The secondary references of Zöller et al. or Hahn, both teach ion plating of metal oxide materials onto 3-dimensional nonplanar substrates, where those of Zöller et al. are optical lenses, which will inherently have curved surfaces, i.e. are nonplanar; and those of Hahn are the interior surfaces of valves, which include threaded sleeve portions, stepped changes in diameter, as well as being curved surfaces. In Hahn, particularly see the abstract; figures 1-5, 2; col. 1, lines 5-14 & 63-col. 2, lines to & 14-47, especially 17-18, 23-25, 28-31 & 40-45; col. 3, lines 7-30 & 45-66; col. 4, lines 8-30 & 58-col. 5, line 5, for teachings of ion plating metal oxides in general, titanium oxide specifically, onto the interior surface of the valve, where deposition thicknesses are taught to be very thin relative to the wall, with thicknesses

on the order of 1000 Angstroms or less mentioned, i.e. 100 nm, and where illustrated deposition thickness is uniform, suggesting conformal. Hahn is silent as to the microstructure of the deposited titanium oxide; or other metal oxides that may be employed. It would have been obvious to one of ordinary skill in the art to deposit amorphous titanium oxide layers as taught in Knapp et al., for the interior coatings of the valves of Hanh, since both teach deposition of titanium oxide material via ion plating, where Knapp et al. includes metal substrates as those that can be effectively coated (col. 5, lines 16-18), and also teaches improved coating characteristics inclusive of low coating stress relative to prior ion plating techniques, noting that stress can cause problems with respect to coating layer adherence (col. 3, lines 35-42 & col. 6, lines 56-59), where reduced stress, hence improved adhesion would have been expected to be advantageous in the protective coatings of Hanh, motivating combination of the teachings.

In Zöller et al., see the abstract; figures 3-4; col. 1, lines 10-27; col. 2, lines 58-col. 3, lines 3-35; col. 5, lines 1-15 & 54-65; col. 6, lines 27-67+; and col. 7, lines 21- 34, for teachings of ion plating multilayer highly uniform optical coatings via ion plating, where evaporation may be via electron beam gun, in the presence of reactive oxygen gas, with possible deposition sequences include alternating Ta_2O_5 & SiO_2 layers to create a refractive, scratch resistant coating for optical lenses made of glass or synthetic plastics. Note as the deposition is taught to be uniform & a lens surface is generally curved, thus for uniform deposition on a curved surface, it must be conformal. It would've been obvious to one of ordinary skill in the art to deposit multilayer coating combinations as taught in Knapp et al., on lens substrates, such as suggested by Zoller et al., using ion plating as taught in either reference, as Knapp et al. (319) is also directed to optical substrates, inclusive of "sighting devices", which may be generically considered to encompass lenses, where the amorphous titanium oxide layer combinations would have been obvious to employ, as they are an analogous to those of Zoller et al. in structure and deposition technique, & since Knapp et al. (319) teach that the use of the amorphous titanium oxide in the multilayer

combinations provides the advantages of enhanced performance characteristics at lower manufacturing prices.

9. Other art of interest includes: Xu et al. (5,962,923) & White (4,468,309), who teach conformal ion plating processes, for three-dimensional objects with shapes as claimed (vias, trenches, steps etc.), but for metal nitride or metal depositions; Shinmi et al. (4,545,881: col. 8, line 51-col. 9, line 21) & Chi et al. (4,819,039), who teach ion plating or electron beam evaporation processes for depositing glass layers, but only mentioned flat substrates; the Japanese patent to Imai (JP 63-128166 A), whose abstract discusses ion plating titanium oxide films on still watch cases, which a show to the figures are 3-D & appear to be conformal & is considered equivalent to Hahn (233) as applied in the above rejection; and Miyamura et al. (2002/0108848 A1), plus the Japanese patents to Nakano (59-127001 A) & Morito (JP 61-010212 A), who all teach multilayer ion plating of metal oxides for various purposes inclusive of optical, but have no specific teachings necessitating nonplanar substrates.

Copending applications to Knapp (11/199606 = 2005/0281985 A1) & (11/891994), have been reviewed, where his noted that the former is to product claims, while the latter is to product & method claims, however the sole method claims is not necessarily directed to ion plating, nor the composition of the multilayer refractive coatings, nor is the shape of the substrate, thus that of the deposit specified.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on M-F from about 8:30 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained

from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MLP/dictation software

9/17/2007

MARIANNE PADGETT
PRIMARY EXAMINER